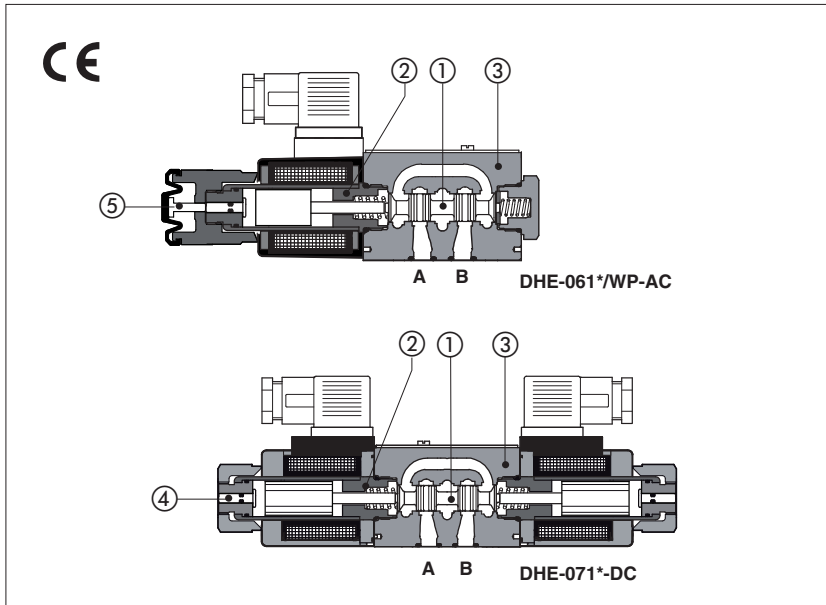


Solenoid directional valves type DHE

direct operated, high performances, ISO 4401 size 06



Spool type, high performance direct operated valves with threaded solenoids certified according to the North American standard **cURus**.

Single and double solenoid valves are available in two or three position configurations and with a wide range of interchangeable spools (1) with different schemes, three or four way connections, see section 2.

Solenoids (2) are made by:

- wet type screwed tube, different for AC and DC power supply, with integrated manual override pin (4)
- interchangeable coils, specific for AC or DC power supply, easily replaceable without tools - see section 5 for available voltages

Standard coils protection **IP65** (once correctly assembled with relevant electric connectors).

The coils are insulated according to class H for DC and F for AC versions.

The valve body (3) is 3 chamber type made by shell-moulding casting with wide internal passages.

Options

- prolonged manual override protected with rubber cap (5) for easy hand operation
- control devices of the valve switching time
- spool position monitor devices for safety applications
- optional **IP67** AMP Junior Timer and Deutsch coil's connectors or lead wire for customized applications
- auxiliary hand lever

Surface mounting ISO 4401 size 06

Max flow up to 80 l/min

Max pressure: 350 bar

1 MODEL CODE

DHE - 0 63 1/2 /A - X 24 DC ** /*

Directional control valves size 06

Valve configuration, see section 2

- 61** = single solenoid, center plus external position, spring centered
- 63** = single solenoid, 2 external positions, spring offset
- 67** = single solenoid, center plus external position, spring offset
- 71** = double solenoid, 3 positions, spring centered
- 75** = double solenoid, 2 external positions, with detent

Spool type, see section 2

Options, see note 1 at section 4

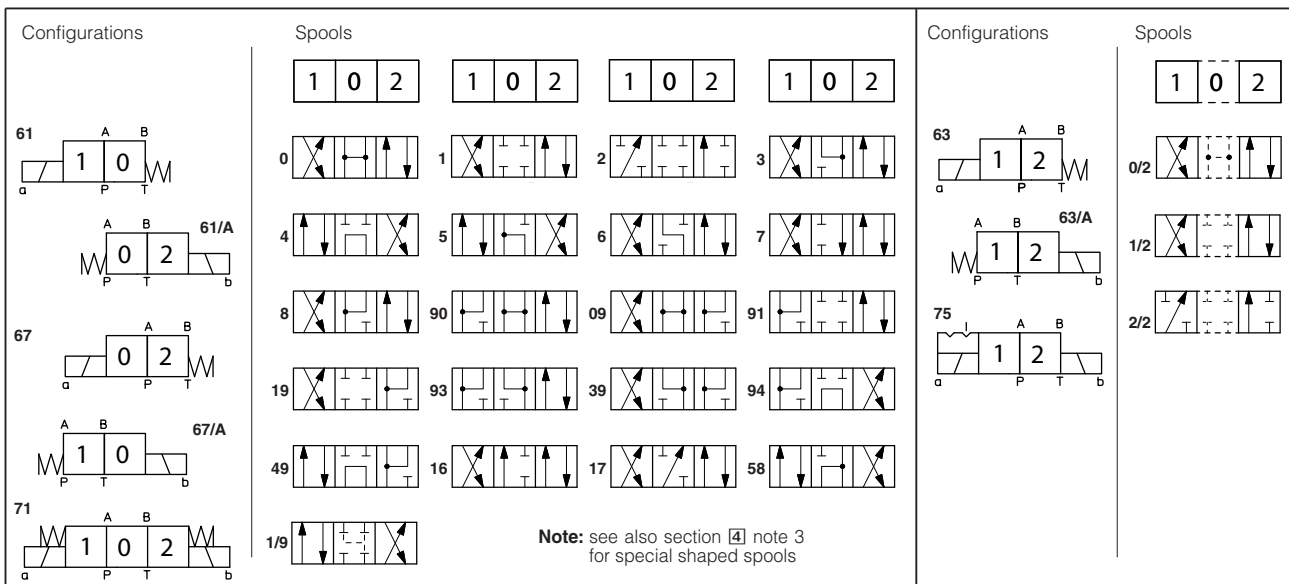
Seals material:
omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

Voltage code, see section 5

- 00-AC** = AC solenoids without coils
 - 00-DC** = DC solenoids without coils
 - X** = without connector
- See note 2 at section 4 for available connectors, to be ordered separately
Coils with special connectors, see section 11
- XJ** = AMP Junior Timer connector
 - XK** = Deutsch connector
 - XS** = Lead Wire connection

2 CONFIGURATIONS and SPOOLS (representation according to ISO 1219-1)



3 MAIN CHARACTERISTICS OF DHE DIRECTIONAL VALVES

| | |
|--|--|
| Assembly position / location | Any position |
| Subplate surface finishing | Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101) |
| MTTFd values according to EN ISO 13849 | 300 years, for further details see technical table P007 |
| Ambient temperature | from -30°C to +70°C (standard seals) -20°C to +70°C (/PE seals) (1) |
| Fluid | Hydraulic mineral oil HL, HLP as per DIN 51524 |
| Recommended viscosity | 15 ÷ 100 mm ² /s - max allowed range 2,8 ÷ 500 mm ² /s |
| Fluid contamination class | ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm (β ₂₅ ≥ 75 recommended) |
| Fluid temperature | -30°C +60°C (standard seals) -20°C +80°C (/PE seals) |
| Flow direction | As shown in the symbols of section 2 |
| Operating pressure | Ports P,A,B: 350 bar; Port T 210 bar for DC version; 160 bar for AC version |
| Rated flow | See diagrams Q/Δp at section 6 |
| Maximum flow | 80 l/min , see operating limits at section 7 |

(1) Option /BT = special version for ambient temperature -40°C +60°C available on request


3.1 Coils characteristics

| | |
|-----------------------------------|--|
| Insulation class | H (180°C) for DC coils F (155°C) for AC coils Due to the occurring surface temperatures of the solenoid coils, the European standards EN ISO 13732-1 and EN ISO 4413 must be taken into account |
| Protection degree to DIN EN 60529 | IP 65 (with connectors 666, 667, 669 or E-SD correctly assembled) |
| Relative duty factor | 100% |
| Supply voltage and frequency | See electric feature 5 |
| Supply voltage tolerance | ± 10% |
| Certification | cURus North American Standard |

4 NOTES

1 Options

- A** = Solenoid mounted at side of port B (only for single solenoid valves). In standard versions, solenoid is mounted at side of port A.
WP = prolonged manual override protected by rubber cap.

 The manual override operation can be possible only if the pressure at T port is lower than 50 bar - see section 12.

WPD/HS-DC = (only for DHE-DC) manual override with detent, to be ordered separately, see tab. K150

L1, L2, L3 = (only for DHE-DC) device for switching time control, installed in the valve solenoid, see section 9.

For spools 4 and 4/8 only device L3 is available.

FI, FV = with proximity or inductive position switch for monitoring spool position: see tab. E110.

MV, MO = auxiliary hand lever positioned vertically (MV) or horizontally (MO). For available configuration and dimensions see table E138.

2 Type of electric/electronic connector DIN 43650, to be ordered separately

666 = standard connector IP-65, suitable for direct connection to electric supply source.

667 = as 666, but with built-in signal led.

669 = with built-in rectifier bridge for supplying DC coils by alternate current (AC 110V and 230V - I_{max} 1A).

E-SD = electronic connector which eliminates electric disturbances when solenoid valves are de-energized.

3 Spools

- spools type **0** and **3** are also available as **0/1** and **3/1** with restricted oil passages in central position, from user ports to tank.
- spools type **1, 4, 5** and **58** are also available as **1/1, 4/8, 5/1** and **58/1**. They are properly shaped to reduce water-hammer shocks during the swiching.
- spools type **1, 1/2, 3, 8** are available as **1P, 1/2P, 3P, 8P** to limit valve internal leakages.
- Other types of spools can be supplied on request.

5 ELECTRIC FEATURES

| External supply nominal voltage ± 10% | Voltage code | Type of connector | Power consumption (2) | Code of spare coil DHE | |
|---------------------------------------|---------------------|-------------------|-----------------------|------------------------|-------------------------|
| 12 DC | 12 DC | 666 or 667 | 30 W | COE-12DC /10 | |
| 14 DC | 14 DC | | | COE-14DC /10 | |
| 24 DC | 24 DC | | | COE-24DC /10 | |
| 28 DC | 28 DC | | | COE-28DC /10 | |
| 48 DC | 48 DC | | | COE-48DC /10 | |
| 110 DC | 110 DC | | | COE-110DC /10 | |
| 125 DC | 125 DC | | | COE-125DC /10 | |
| 220 DC | 220 DC | | | COE-220DC /10 | |
| 110/50 AC | 110/50/60 AC | | | 58 VA (3) | COE-110/50/60AC /10 (1) |
| 230/50 AC | 230/50/60 AC | | | | COE-230/50/60AC /10 (1) |
| 115/60 AC | 115/60 AC | 68 VA (3) | COE-115/60AC | | |
| 230/60 AC | 230/60 AC | | COE-230/60AC | | |
| 110/50 AC - 120/60 AC | 110 RC | 669 | 30 W | COE-110RC | |
| 230/50 AC - 230/60 AC | 230 RC | | | COE-230RC | |

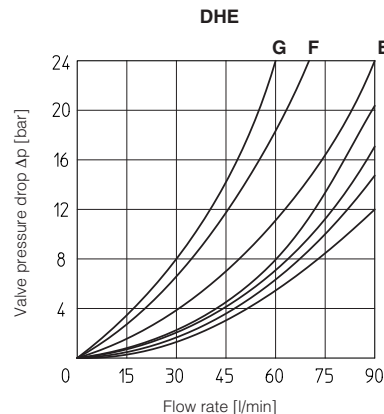
(1) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 52 VA.

(2) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.

(3) When solenoid is energized, the inrush current is approx 3 times the holding current. Inrush current values correspond to a power consumption of about 160 VA.

6 Q/ΔP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

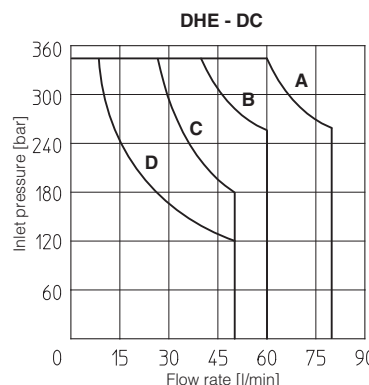
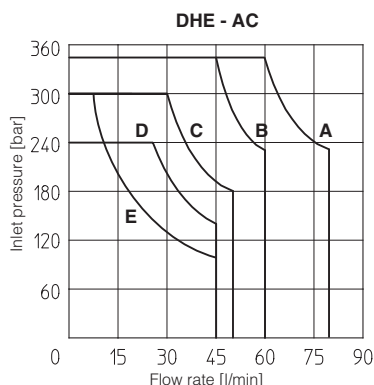
| Spool type | Flow direction | | | | |
|----------------------------------|----------------|-----|-----|-----|-----|
| | P→A | P→B | A→T | B→T | P→T |
| 0, 0/1 | A | A | C | C | D |
| 1, 1/1, 1/9 | D | C | C | C | |
| 3, 3/1 | D | D | A | A | |
| 4, 4/8, 5, 5/1, 49, 58, 58/1, 94 | F | F | G | C | E |
| 1/2, 0/2 | D | D | D | D | |
| 6, 7, 16, 17 | D | D | D | D | |
| 8 | A | A | E | E | |
| 2 | D | D | | | |
| 2/2 | F | F | | | |
| 09, 19, 90, 91 | E | E | D | D | |
| 39, 93 | F | F | G | G | |



7 OPERATING LIMITS based on mineral oil ISO VG 46 at 50°C

The diagrams have been obtained with warm solenoids and power supply at lowest value ($V_{nom} - 10\%$). The curves refer to application with symmetrical flow through the valve (i.e. P→A and B→T). In case of asymmetric flow and if the valves have the devices for controlling the switching times the operating limits must be reduced.

| Curve | Spool type | |
|-------|--|---|
| | AC | DC |
| A | 1, 1/2, 8 | 0, 0/1, 1, 1/2, 3, 8 |
| B | 0, 0/1, 0/2, 1/1, 1/9, 3 | 0/2, 1/1, 6, 7, 1/9, 19 |
| C | 3, 3/1, 6, 7 | 3/1, 4, 4/8, 5, 5/1, 16, 17, 19, 39, 49, 58, 58/1, 09, 90, 91, 93, 94 |
| D | 4, 4/8, 5, 5/1, 16, 17, 19, 39, 58, 58/1, 09, 90, 91, 93, 94 | 2, 2/2 |
| E | 2, 2/2 | - |



8 SWITCHING TIMES (average values in msec)

Test conditions: - 36 l/min; 150 bar
 - nominal voltage
 - 2 bar of counter pressure on port T
 - mineral oil: ISO VG 46 at 50°C

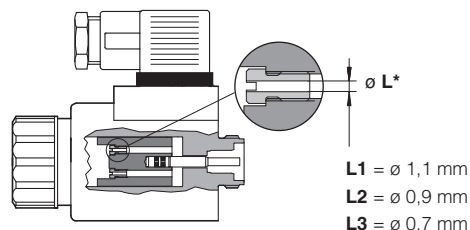
The elasticity of the hydraulic circuit and the variations of the hydraulic characteristics and temperature affect the response time.

| Valve | Switch-on AC | Switch-off AC | Switch-on DC | Switch-off DC |
|----------|--------------|---------------|--------------|---------------|
| DHE | 10 - 25 | 20 - 40 | 30 - 50 | 15 - 25 |
| DHE-*/L1 | — | — | 60 | 60 |
| DHE-*/L2 | — | — | 80 | 80 |
| DHE-*/L3 | — | — | 150 | 150 |

9 DEVICES FOR THE SWITCHING TIME CONTROL

These devices are used to control the valve's switching time (only for DC version) and therefore reduce the hammering shocks in the hydraulic circuit.

Options L1, L2, L3 control the switching time in both moving directions of the valve spool by means of calibrated restrictors installed in the solenoid anchor.



10 SWITCHING FREQUENCY

| Valve | AC (cycles/h) | DC (cycles/h) |
|-----------------|---------------|---------------|
| DHE + 666 / 667 | 7200 | 15000 |

11 COIL WITH SPECIAL CONNECTORS only for voltage supply 12, 14, 24, 28 Vdc

| AMP Junior timer connector | Deutsch connector DT-04-2P | Lead Wire connection |
|---|--|--|
| <p>Options -XJ Coil type COEJ AMP Junior Timer connector Protection degree IP67</p> | <p>Options -XK Coil type COEK Deutsch connector DT-04-2P male Protection degree IP67</p> | <p>Options -XS Coil type COES Lead Wire connection Cable length = 180 mm</p> |

Note: for the electric characteristics refer to standard coils features - see section 5

12 DIMENSIONS [mm]

ISO 4401: 2005

Mounting surface: 4401-03-02-0-05

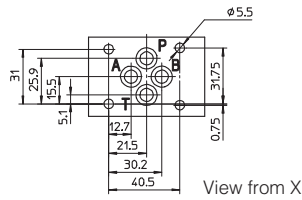
Fastening bolts: 4 socket head screws:

M5x30 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108

Ports P,A,B,T: $\varnothing = 7.5$ mm (max)

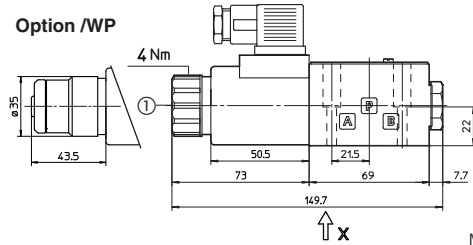


P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT

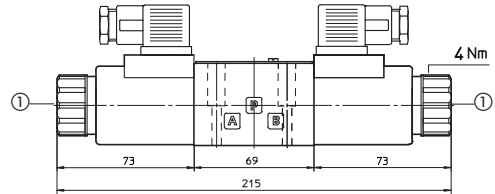
DHE-06(DC)

DHE-07(DC)

Option /WP



Mass: 1,5 kg

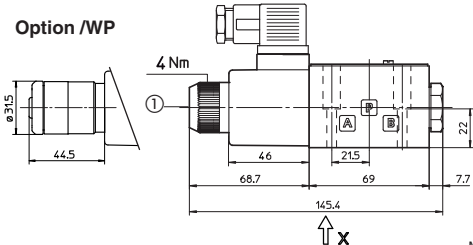


Mass: 2 kg

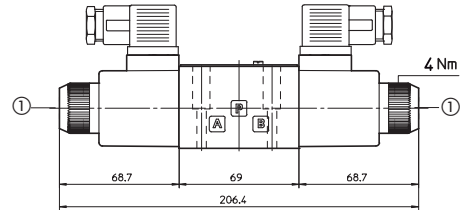
DHE-06(AC)

DHE-07(AC)

Option /WP



Mass: 1,4 kg



Mass: 1,8 kg

① Standard manual override PIN

⚠ The manual override operation can be possible only if the pressure at T ports is lower than 50 bar

Overall dimensions refer to valves with connector 666

13 PLUG-IN RESTRICTOR (to be ordered separately)

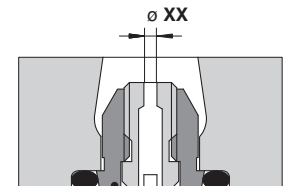
The use of plug-in restrictors in valve's ports P or A or B may be necessary in case of particular conditions as long flexible hoses or the presence of accumulators which could cause at the valve switching instantaneous high flow peaks over the max valve's operating limits.

Ordering code: **PLUG H-XX**

XX = 08, 10, 12, 15 calibrated orifice diameter in tenths of mm

Example **PLUG-H-12** = orifice diameter **1,2 mm**

Other orifice dimensions are available on request



PLUG H-XX

14 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 (to be ordered separately)

| 666, 667 (for AC or DC supply) | | 669 (for AC supply) | | CONNECTOR WIRING | | |
|--------------------------------|--|---|--|--|--|---|
| | | | | 666, 667 1 = Positive ⊕ 2 = Negative ⊖ ⊕ = Coil ground | | 669 1,2 = Supply voltage V _{AC} 3 = Coil ground |
| SUPPLY VOLTAGES | | | | | | |
| 666 All voltages | | 667 24 AC or DC 110 AC or DC 220 AC or DC | | 669 110/50 AC 110/60 AC 230/50 AC 230/60 AC | | |

Note: for electronic connectors type **E-SD**, see tab. K500

15 MOUNTING SUBPLATES

| Model | Ports location | GAS Ports A-B-P-T | Ø Counterbore [mm] A-B-P-T | Mass [kg] |
|--------|---|-------------------|----------------------------|-----------|
| BA-202 | Ports A, B, P, T underneath; | 3/8" | – | 1,2 |
| BA-204 | Ports P, T underneath; ports A, B on lateral side | 3/8" | 25,5 | 1,8 |
| BA-302 | Ports A, B, P, T underneath | 1/2" | 30 | 1,8 |

The subplates are supplied with 4 fastening bolts M5x50. Also available are multi-station subplates and modular subplates. For further details see table K280.